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SIX-YEAR TECHNOLOGICAL PLAN  
OF THE METAL INDUSTRY

As estimated in the Six-Year Plan, the volume of production in the machine building industry will increase 2½ times and productivity will increase 46 percent. This achievement would be impossible without important technological changes in the metal industry. It is necessary to mechanize and speed up processes, to introduce multiple operation methods in production, to modernize machine tools and to reorganize the workshops. All this is embraced in the technological plan.

To speed up production processes, the technological plan provides for a number of new operation methods intended to shorten considerably not only the length of productive processes but also the time used in tool setting up, clamping the work to the machine, etc.

Tools of Heat-Treated Alloys

To reduce cutting time, tools made of heat-treated alloys will be widely used, increasing the cutting speed to 300 meters a minute or even more. Heat-treated alloy tools will be used not only in lathes but also in drilling and milling machines. The Starachowickie Plants, the Ursus Tractor Plant, and the plants in Rzeszow are already using heat-treated alloy tools for milling and drilling machines with remarkable results.

Tools with negative top rake angles will also be used extensively.

With the proposed changes, the cutting speed of the machines will be greatly increased, requiring a corresponding increase in power and the strengthening of the mountings. Accordingly, the plan provides for the rebuilding of the existing machines to incorporate the necessary changes and the manufacture of new machines. Within the period of the plan, the average power of a machine-tool motor will be increased from 4.9 to 7 horsepower.

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Multiple-Tool Machines

To speed up production, multiple-tool machines will be used extensively, especially in factories engaged in assembly line production and especially in automobile plants, tractor plants, and machine-tool plants. Multiple drilling machines, encased milling machines, multiple-tool machines, and combination machine tools will be widely used. Domestic production of these machines will be started. The number of multiple-tool machines in the machine park will be doubled. The use of automatic machines, turret lathes, draw plates, and radial drilling machines will increase while the number of small output machines, such as lathes and shaping machines will decrease. The number of turret lathes will be increased to twice the number of lathes.

An important task of the technological plan is to shorten the time of preparation as well as the machining time. The use of automatic and semi-automatic chucks will be adopted to shorten the time of attaching the work-piece to the machine. Production of automatic chucks will increase elevenfold and the percentage of machine tools equipped with automatic chucks fivefold. To insure better-equipped machines, a central plant for the production of chucks and other tools will be opened.

During the period of the plan, manufacture will begin on machines which, while one machining operation is in progress, can be set for the next operation, thus reducing the time of changeover from one operation to another.

The heat-treatment operation will be radically shortened by adopting high-frequency current, and carbonization and decarbonization by means of gases instead of powders.

Welding and Pressing

The tendency of the new construction technique in the metals industry is to change over to the welding together of pressed parts even in the production of precision instruments. It is expected that this method of manufacture will be widely used, especially in large-scale assembly-line production. The welding of high-strength steel and automatic welding will be perfected. Foundries and forges will be basically reorganized and mechanized. Several new foundries will be built, entirely mechanized with automatic sand conveyors, automatic molding, and automatic-conditioning of sand. As a result of modernization, mechanized production of castings will represent almost one half of the total value. In the molding sections the average output from one square meter will increase from 2.2 tons to 3.7 tons and the productivity of a molder will be 2½ times greater in mechanized operation than in manual operation. The method of forging with molds will be used to a great extent (62 percent). Coal furnaces will be replaced by gas furnaces.

Assembly-Line Production

To make the proposed technical changes effective, important changes in shop organization are foreseen. The assembly-line system will be installed, with machine tools placed in the order of their operation. One man will operate several machines simultaneously, especially machines with long cycles of operation, such as heavy lathes, horizontal shaping machines, round work milling machines, and shaping and grinding machines for gears. Cranes will be installed beside the heavy machines to facilitate moving heavy parts.

At least 14 plants will adopt the assembly-line system, especially plants producing automobiles, tractors, farm machines, machine tools, bicycles, motorcycles, water meters, farm engines, and textile machines.

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Mechanization of Transport Within the Plant

During the period of the plan, transport within the plants, which now is quite primitive, even in the modern plants, will be radically mechanized. Besides assembly conveyors, the following will be widely used: roller conveyors, chutes, stationary cranes, and self-loading carts with movable platforms. Installed power in transport equipment per worker will be doubled.

It will take concerted effort on the part of industrial, trade, and party organizations to put through these plans. Literature on high-speed cutting, on tools with negative top rake angles, and on standardization of tooling and chucks should be compiled and published. Experience of snock workers should be made available to a great number of workers. Through periodicals, courses, and displays, it will be necessary to acquaint the workers and technicians with the new methods of heat treatment, such as tempering with high-frequency current, extrusion, and cementation with gas.

Shop competition in high-speed cutting operations, innovations, and setting up tools should be initiated.

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